AGC
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TACONIC

HF-300F Flame Retardant High Performance Thermoset

HF-300F is a flame retardant, ceramic-filled hydrocarbon-based copper clad laminate reinforced with woven fiberglass. The special ceramic-filled hydrocarbon composite offers low signal loss and superior, stable PIMD performance of -165 dBc in microwave antenna applications.

HF-300F is well suited for hybrid multilayer applications. Emerging multilayer telecom applications put new demands on RF materials. HF-300F is dimensionally stable, has a low CTE, and is lightweight. HF-300F is based on a rigid thermoset resin system and offers advantages in PCB fabrication for large format, multilayer applications. HF-300F has all of the characteristics of materials normally used for high speed digital with the added features that thicker dielectrics can be manufactured with tightly controlled RF properties.

Traditional thermoset laminates can degrade by oxidation with time and elevated temperatures. Oxidation is permanent and leads to a shift toward a higher dielectric constant, elevated loss values, and changing color. The impact of shifting dielectric properties depends on circuit design, operating power, and use temperature. HF-300F has been developed with much better resistance to oxidation. HF-300F also has low moisture absorption. The combination of low moisture absorption and stable dielectric properties over time, temperature, and frequency, make HF-300F very attractive for RF antenna applications in demanding environments.

HF-300F can be fabricated using standard FR-4 PCB fabrication without special hole wall preparation. The low CTE values enable reliable hybrid multilayer constructions.

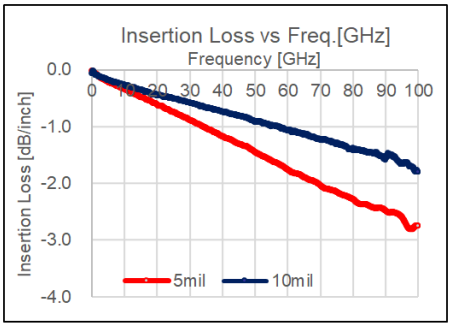
HF-300F is a highly engineered composite designed to meet the demands of high volume RF / microwave applications.

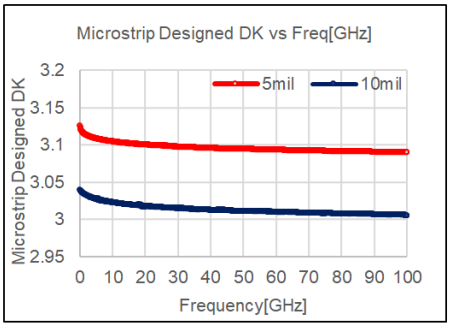
Benefits & Applications:

- Stable frequency response over 77GHz application
- Excellent PIMD performance* (measured at -165 dBc)
- Low DF / Insertion loss
- Controlled DK & Impedance
- 25% lower weight than comparable materials
- Well Suited for Hybrid Multilayers
- Enhanced Oxidation Resistance
- Stable Dielectric Properties over Temperature and Frequency
- Low Moisture Absorption
- Low CTE for Multilayer Applications
- Dimensionally Stable
- High Performance / Price Ratio

- Automotive Radar sensor
- Base Station Antenna
- Passive Components
  - Filters, Combiners, Dividers
- Aerospace

*Measurement using manufactured PCB coupon with 20 watts per channel @ 800 and 1800MHz.





HF-300F Offers Superior RF Performance Over Frequency

½ oz. RTF copper has been used for insertion loss measurement.

Designed DK measured by Micro-strip Differential Phase Length.

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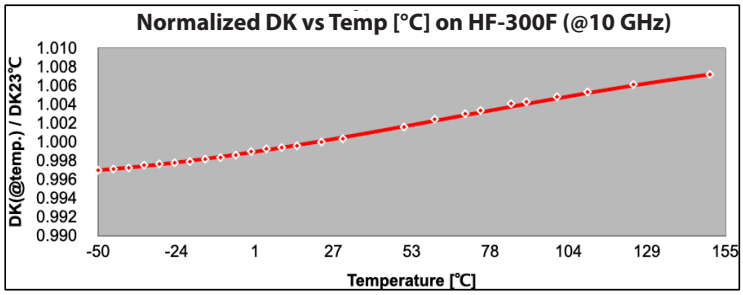
HF-300F Typical Values					
Property	**Test Method**	**Unit**	**Value**	**Unit**	**Value**
Dk @ 10 GHz	IPC-650 2.5.5.5.1 Mod.		3.00 ± 0.05		3.00 ± 0.05
Designed DK(30 mil)	MS Differential Phase Length		2.98		2.98
Df @ 2 GHz	IPC-650 2.5.5.5.1 Mod.		0.0022		0.0022
Df @ 3.7 GHz	IPC-650 2.5.5.5.1 Mod.		0.0024		0.0024
Df @ 5 GHz	IPC-650 2.5.5.5.1 Mod.		0.0026		0.0026
Df @ 10 GHz	IPC-650 2.5.5.5.1 Mod.		0.0029		0.0029
TcK (-50 to 150 °C)	IPC-650 2.5.5.5	ppm/°C	+51	ppm/°C	+51
PIMD (Immersion Tin Finish)	43dBm swept @1800MHz	dBc	-165	dBc	-165
Moisture Absorption	IPC-650 2.6.2.1	%	0.08	%	0.08
Peel Strength(1 oz. RTF copper)	IPC-650 2.4.8(Solder)	lbs/in	3.5	N/mm	0.6
Peel Strength(1 oz. RCC)	IPC-650 2.4.8(Solder)	lbs/in	4.5	N/mm	0.8
Dimensional Stability	IPC-650 2.4.39(After Etch)	% (MD)	-0.015	% (CD)	-0.011
Dimensional Stability	IPC-650 2.4.39(After Bake)	% (MD)	-0.047	% (CD)	-0.047
Dimensional Stability	IPC-650 2.4.39(After Stress)	% (MD)	-0.054	% (CD)	-0.051
Flexural Strength(MD/CD)	IPC-650 2.4.4	psi (MD)	23,000	psi (CD)	25,000
Tensile Strength(MD/CD)	IPC-650 2.4.18.3	psi (MD)	22,000	psi (CD)	18,000
Density(Specific Gravity)	IPC-650 2.3.5	g/cm^3	1.50	g/cm^3	1.50
Specific Heat	IPC-650 2.4.50	J/g°C	0.95	J/g°C	0.95
Thermal Conductivity(Unclad)	IPC-650 2.4.50	W/M*K	0.45	W/M*K	0.45
T_d(2% wt. loss)	IPC-650 2.4.24.6/TGA	°F	698	°C	370
T_d(5% wt. loss)	IPC-650 2.4.24.6/TGA	°F	725	°C	385
CTE(X -Y axis)(50 to 150 °C)	IPC-650 2.4.41	ppm/°C	12-18	ppm/°C	12-18
CTE(Z axis)(50 to 150 °C)	IPC-650 2.4.41	ppm/°C	65	ppm/°C	65
Flammability	UL 94	-	V-0	-	V-0
Lead Free Process Compatible	Internal		Yes		Yes

All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.



HF-300F Offers Very Stable Performance Over a Wide Temperature Range.

Dielectric layers of HF-300F are on the basis of hydrocarbon thermoset composite materials.

Standard HF-300F series can be manufactured in increments of 0.005" (5 mil). Please call for availability of additional thicknesses.

Our Standard panel size is 18" x 24" (457mm X 610mm). Please call for availability of other sizes.

Please call for other types of cladding.

Standard Dielectric Thickness (mil)	Standard Panel Size	Standard Copper
5, 10, 20, 30, 60 (available in 5 mil increments)	12" x 18", 18" x 24" 12" x 48", 36" x 48"	½ oz. Reverse Treated ED Foil 1 oz. Reverse Treated ED Foil

An example of 30 mil material with 1 oz. Reverse Treated Cu on both sides is part# :
HF-300F-0300-CL1/CL1-18" x 24" (HF-300F-0300-CL1/CL1-457mm x 610mm)

Rev. 7/21